## REMARKS

Claims 1-53 are now pending in the application. Claims 51 - 53 are added by this amendment. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

### APPLICANT INITIATED INTERVIEW

Applicants thank the Examiner for the interview granted with Applicants' representative on January 24, 2007. During the interview, amended Claims 1 and 17 were discussed in light of the cited art. Specifically, Applicants' representative argued that Ferre et al. did not anticipate the method of amended Claim 1. Applicants' representative also discussed amended Claim 17 with the Examiner in light of Kelly et al., and argued that Kelly et al. does not anticipate amended Claim 17. No agreement was reached, however, as to the allowability of any of the claims.

### DOUBLE PATENTING REJECTION

Claims 27-50 are rejected under 35 U.S.C. 101 as claiming the same invention as that of claims 1, 3, 10, 11, 12, 16, 19 and 25 of prior U.S. Patent No. 6,636,757. This is a double patenting rejection. Claims 30, 32, 47 and 49 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. 6,636,757. These rejections are respectfully traversed.

Regarding Claims 27-50, which stand rejected under 35 U.S.C. 101 as claiming the same invention as claimed in U.S. Patent No. 6,636,757. Claim 1 of U.S. Patent No. 6,636,757 recites,

> 1. An electromagnetic navigation system for use in navigating a probe through an electromagnetic field positioned near a C-arm, said electromagnetic navigation system comprising: a transmitter coil array having a plurality of transmitter coils, said transmitter coil array operable to generate the electromagnetic field to navigate the probe; and a shield attached to the C-arm, said shield operable to substantially shield the C-arm from the electromagnetic field generated by said transmitter coil array, wherein said shield substantially reduces distortion of the electromagnetic field by the C-arm, thereby enabling accurate navigation of the probe in the electromagnetic field.

Applicants note that Claim 27 of the present application recites, "An electromagnetic navigation system for use in navigating an instrument through an electromagnetic field positioned near a metal object . . . a transmitter coil array having a plurality of transmitter coils, said transmitter coil array operable to generate the electromagnetic field to navigate the instrument". Applicants respectfully submit that Claim 27 does not claim the same invention as claimed in U.S. Patent No. 6,636,757, represented by Claim 1 thereof. For example, Applicants submit that "instrument" recited in Claim 27 is broader than "probe" recited in Claim 1 of U.S. Patent No. 6,636,757.

The Manual of Patent Examination and Procedure (MPEP) notes,

> "Same invention" means identical subject matter. *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1984); *In re Vogel,* 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957). A reliable test for double patenting under 35 U.S.C. 101 is whether a claim in the application could be literally infringed without literally infringing a corresponding claim in the patent. *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970). Is there an embodiment of the invention that falls within the scope of one claim, but not the other? If there is such an embodiment, then identical subject matter is not defined by both claims and statutory double patenting would not exist. For example, the invention defined by a claim reciting a compound having a "halogen" substituent is not identical to or substantively the same as a claim reciting the same compound except having a "chlorine" substituent in place of the halogen because "halogen" is broader than "chlorine."

See MPEP 804 (II)(A). As noted above Applicants submit that at least one term in Claim 27 is broader than a term in Claim 1 of U.S. Patent No. 6,636,757. Thus, Applicants respectfully request that the Examiner withdraw this rejection.

Applicants file herewith a Terminal Disclaimer disclaiming the terminal portion of any patent that would issue from the present application, U.S. Patent Application No. 10/649,214. Applicants submit that the concurrently filed Terminal Disclaimer renders this rejection moot, and requests that the Examiner remove the Double Patenting rejection.

**REJECTION UNDER 35 U.S.C. § 102 AND § 103**

Claims 1, 2, 7 and 13-16 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Ferre, et al. (U.S. Pat. No. 6,175,756). Claims 17-24 and 26 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Kelly, et al. (U.S. Pat. No. 5,787,886). Claim 3 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Ferre ('756). Claims 5, 6 and 8-12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ferre ('756) in view of Kelly ('886). Claim 4 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Ferre ('756) in view of Shapiro (U.S. Pat. No. 5,777,720). Claim 25 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Kelly ('886) in view of Duffin (U.S. Pat. No. 5,752,976). These rejections are respectfully traversed.

Applicant's note that various claims, including independent Claim 1, are rejected under 35 U.S.C. 102 (e) as being anticipated by Ferre et al. Applicants reserve the right

to submit and provide evidence of prior conception and/or reduction to practice of the currently claimed invention to remove Ferre et al. as prior art.

Ferre, et al. is directed to a system that can track a device in a medical application. According to Ferre et al., field integrity detection can be performed with a reference sensor. See col. 10, lines 35-38. Ferre et al. describes the use of the reference sensor by establishing reference value for a virtual point location in the reference sensor coordinate system. The reference value is taken in a distortion free environment. During use of the system, the actual measured values of the virtual points are compared to the stored reference values to detect and confirm field integrity. See col. 11, lines 51-62. Ferre et al. describes the use of the reference sensor for field integrity, in all applications. The field integrity is based upon the measurement of the field by a reference sensor during a procedure and can be compared to a "distortion free" measurement that is made and stored in the system. Such a system does not appear to describe a calibration process including positioning a calibration sensor, as discussed further herein. Ferre et al. also does not appear to describe a method or system for accounting for error or distortion if any is detected.

Kelly et al. is directed to a digitizer system for use during an operative procedure. Kelly et al. describes a system that allows calibration of the system during a procedure. The calibration system allows for the creation of a database of warped cubes. Distortion factors can be calculated based upon the measurements taken with the calibration system. See col. 16, lines 3-5. During the measurements, various points not at the corners of any particular calibration cube (using 343 points sensed with the system) can be interpolated. Once the warp factor is determined, the warp factor can

be applied to the coordinates detected by the "bird" system to determine the accurate X, Y, and Z coordinates corresponding to points in the CT scans. See col. 18, lines 23-33. The database of Kelly et al. can store a plurality of warp numbers. Kelly et al. discloses directly applying the warp numbers to the detected coordinates to convert the warped coordinates to accurate coordinates. Kelly et al. also appears to describe that interpolation occurs to create the warp factors for the points within the calibration system, as discussed further herein.

Shapiro et al. is directed to a system that allows for calibration of an observer tracking display, and various aspects relating thereto, for creating a correlated display. Duffin et al. is directed to a patient location and data telemetry system. The system of Duffin et al. appears to be directed to an implantable device that can be carried within a patient and with which communications can occur to reprogram and control the device.

In contrast, Independent Claim 1 is directed to a method of calibrating an electromagnetic system and recites, "positioning the electromagnetic navigation system in a working environment to account for metallic distortion caused by a metallic object adjacent to the electromagnetic field; positioning a calibration sensor at a first calibration point in the working environment; . . . wherein effects of metallic distortion caused by the metallic object is taken into account during the calibration process". As discussed above, Ferre et al. specifically describes that a reference sensor is used to create a virtual point in a setting where substantially no interference occurs. Applicants respectfully submit, therefore, that Ferre et al. is contrary to independent Claim 1. Independent Claim 1 specifically describes a method that includes positioning the electromagnetic system in a position to account for metallic distortion. Therefore, Ferre

et al. does not anticipate or fairly suggest independent Claim 1 or any of the claims that depend directly or indirectly from Claim 1.

In addition, various other claims, which depend directly or indirectly from Claim 1, include patentable subject matter. For example, dependent Claim 2 recites, "energizing a plurality of coils sequentially in the transmitter coil array to generate a plurality of fields". Applicants respectfully submit that the cited art, either alone or in combination does not teach each of the elements of dependent Claim 2. Dependent Claim 3 recites, "repeating portion (e) to generate about eight thousand calibration points." Applicants respectfully submit that the cited art, either alone or in combination, fails to teach or fairly suggest dependent Claim 3. A further example includes dependent Claim 9, which recites, "using the stored field strength sensed by the calibration sensor to interpolate fields at a guess point in space". As discussed above, Applicants respectfully submit that the cited art does not teach or fairly suggest interpolation as recited in the various claims. Various other claims also include patentable elements including dependent Claims 4, 10, 11, 12, etc.

Independent Claim 17 recites,

> "referencing a predetermined look-up table created of calibration field strengths at a plurality of calibration points that account for metallic distortion . . . selecting a guess point . . . energizing the transmitter coil array to generate the electromagnetic field adjacent to the metallic object after the predetermined look-up table is created; sensing the electromagnetic field with the instrument; interpolating the field strength at the guess point using the predetermined look-up table if the guess point is not at one of the plurality of calibration points; calculating the difference in field strengths between the guess point and the electromagnetic field sensed by the instrument; and refining the guess point by determining a minimized distance between the field strength

at the guess point and the electromagnetic field sensed by the instrument."

As discussed above, Kelly et al. describes a system including determining a warp or distortion factor based upon a warp calibration points. Although Kelly et al. teaches interpolation to determine points between actual sensed calibration points, Kelly et al. does not teach or fairly suggest the method recited in Claim 17 including interpolating the field strength of the guess point using the predetermined look-up table if the guess point is not at one of the plurality of calibration points.

In addition, Applicants submit, that Kelly et al., or any of the cited art either alone or in combination, does not teach or fairly suggest refining the guess point as recited in independent Claim 17. Kelly et al. describes that the warp coordinates can be corrected and converted to accurate coordinates using the distortion factor. Applicants respectfully submit, however, that Kelly et al., either alone or in combination, does not teach or fairly suggest the method of refining as recited in independent Claim 17. While Kelly et al. calculates distortion factors and convert warp coordinates (See Kelly et al., col. 16, lines 3-5 and col. 18, lines 23-29), Kelly et al. does not perform the method of interpolating and refining as recited in Claim 17. Therefore, Applicants respectfully submit that independent Claim 17, and each of the claims that depend directly or indirectly therefrom, is in condition for allowance.

In addition, Applicants respectfully submit that various claims that depend from independent Claim 17 include patentable subject matter separate from independent Claim 17. For example, dependent Claim 18 recites, "selecting the guess point includes selecting an arbitrary start guess point." Applicants respectfully submit that the cited art, either alone or in combination, does not teach or fairly suggest selecting an arbitrary

guess point as recited in dependent Claim 18. In addition, dependent Claim 19 recites, "energizing the plurality of coils in the transmitter coil array in at least one of a time division multiplex manner, frequency division multiplex manner, or a combination of both." Applicants respectfully submit that dependent Claim 19 is not taught or fairly suggested by the cited art. Further, dependent Claim 21 recites, "wherein refining the guess point includes performing a minimization process to selecting new guess point that is closer to the actual instrument location." As discussed above, the cited art, either alone or in combination, does not teach or fairly suggest a minimization process to select a new guess point that is closer to the actual instrument location.

**NEW CLAIMS**

New Claims 51 and 52 depend directly or indirectly from independent Claim 1. Support for new Claims 51 and 52 can be found throughout the application as filed, including paragraphs 52-56. Further, Applicants submit that the cited art does not teach or fairly suggest the elements of Claims 51 and 52. Claim 51 recites, "determining an orientation and location of a metal object." Applicants respectfully submit that the cited art, either alone or in combination, does not teach the elements recited in dependent Claim 51. Dependent Claim 52 recites, "predetermining a position of a metal object in an area where the electromagnetic navigation system is to be used". Again, Applicants submit that the cited art does not teach or fairly suggest each of the elements recited in

dependent Claim 52. Therefore, Applicants respectfully submit that dependent Claims 51 and 52 are also in condition for allowance.

New Claim 53 recites, "creating the predetermined look-up table prior to referencing the predetermined look-up table and prior to navigating an instrument." Applicants submit that the cited art, either alone or in combination, does not teach or fairly suggest creating the predetermined look-up table at the time recited in Claim 53.

**ALLOWABLE SUBJECT MATTER**

Applicants note that Claims 27-29, 31, 33-46, and 48-50 are not rejected for any reason in the Office Action. Therefore, Applicants assume that these claims are in condition for allowance and request that the Examiner indicate these claims as allowed in the next Office Action.

**CONCLUSION**

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action and the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested.

If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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